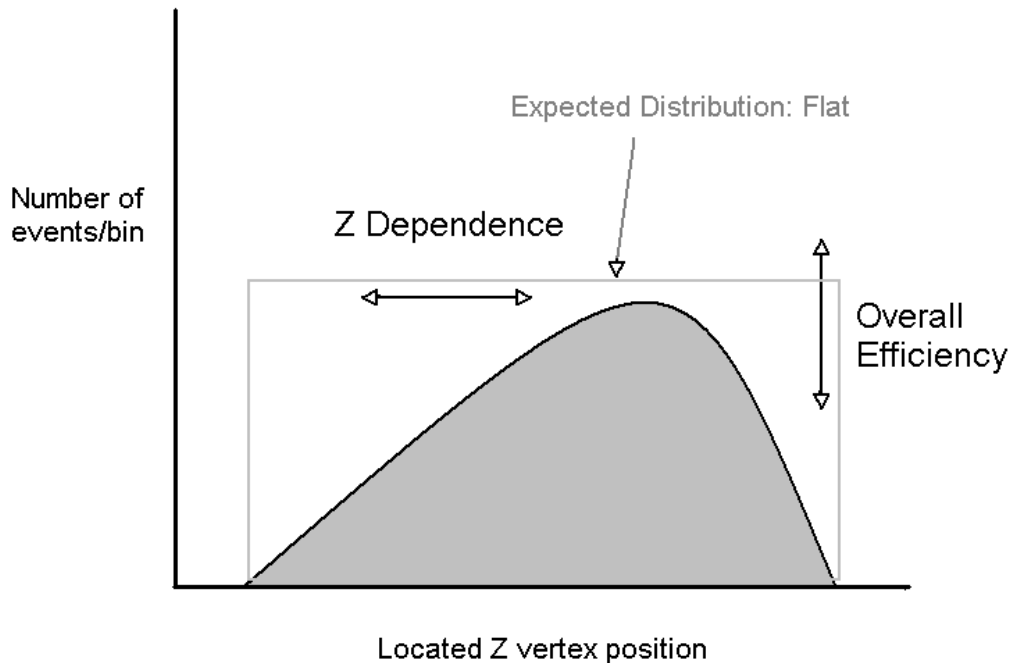# Event Location Efficiency Study

Specifically I'll be looking at the Z dependence….

$\rightarrow$ Overall Z dependence of location efficiency can be factorized into two parts:

1) Spectrometer prediction efficiency
2) Emulsion Scan efficiency

An attempt will be made to separate the two terms

$\rightarrow$ **225 located events were used in this study**

• In figure 1 the emulsion Z vertex distribution of the located events is shown – clearly it is not flat!

• The predicted spectrometer Z vertex distribution(proc 1) is shown on the top plot in figure 2. The entries are **all** proc 1 vertices from refit events independent of location status. Included is a cut on slin > 12 – number of SF lines in U/V. (533 events).

• The bottom plot in figure 2 is the same distribution in figure 1 **but** corrected for the predicted distribution. Therefore one should be able to extract the *upper limit* to emulsion vertex-finding efficiency from this plot:

75±8%

• In an attempt to understand were the Z dependent inefficiencies arise from, the modules were split into three almost equal sections (Z<0.02m,0.02<Z<0.04m,Z>0.04m). These sections were called upstream, middle, downstream respectively. Figures 4,5 and 6 show the difference between the Emulsion located and SF predicted for the three Z sections, for all views U,V, and Z.

- I used the following net-scan volume for *all* events:

$$\pm\textbf{2.5mm U} \times \pm\textbf{2.5mm V} \times \pm\textbf{14mm Z}$$

Assuming the distributions in figures 4,5, and 6 are gaussian, I used the fitted σ's to determine the losses from the edges in the above scan volume:

	U View	V View	Z View	Total Loss
Upstream Section	**25+22-14%**	**~0.5%**	**~0.5%**	**26+22-14%**
Middle Section	**14+14-14%**	**~0.2%**	**8.5+7-5.5%**	**24+15-15%**
Downstream Section	**~0**	**~0.2%**	**1.2%**	**1.4%**

The bottom plot in figure 2 has these points superimposed on the data.

- Conclusions: Most of the losses seem to be coming through the U View.